

“On the Presence of two Vermiform Nuclei in the Fertilised Embryo-sac of *Lilium Martagon*.” By ETHEL SARGANT. Communicated by Dr. D. H. SCOTT, F.R.S. Received April 28,—Read May 4, 1899.

In a communication to the Russian Scientific Congress, which met at Kieff, last summer, Professor S. Nawaschin summarised the brilliant results of his recent work on the fertilised embryo-sac of *Lilium Martagon* and *Fritillaria tenella* (August 30, 1898). The report of this paper, published in the ‘*Botanisches Centralblatt*’ for January 4, 1899, led Professor Léon Guignard to contribute a short account of his hitherto unpublished researches on similar stages in the life-history of some species of *Lilium* (*L. martagon*, *L. pyrenaicum*, and others) to the Académie des Sciences of Paris (April 4, 1899).

The results thus obtained independently by two distinguished botanists are in perfect accord, and present the greatest theoretical interest. They find that both the male generative nuclei on emerging from the pollen tube are elongated in shape, and that each is more or less twisted on its own axis. The nuclei, in fact, appear to have been killed by the fixative in the act of spontaneous movement within the embryo-sac. M. Guignard compares this motion to that of a non-ciliated antherozoid.\* The “vermiform” shape can be traced in the male nucleus for some time after it has joined the nucleus of the ovum.†

The most startling discovery, however, is that the second generative nucleus unites with the upper polar nucleus of the embryo-sac, and that both then fuse with the lower polar nucleus. Thus the definitive nucleus of the embryo-sac, which later on gives rise by repeated division to the endosperm nuclei, is formed by the coalescence of three nuclei of very different origin. One is the sister-nucleus of the male element in the fertilised ovum; another, the sister-nucleus of the female element; and the third has all the characters of a vegetative nucleus. Professors Nawaschin and Guignard are in complete agreement as to these facts. M. Guignard adds that occasionally the polar nuclei have united before the arrival of the “antherozoid,” and gives a number of figures in which the triple fusion is perfectly clear.

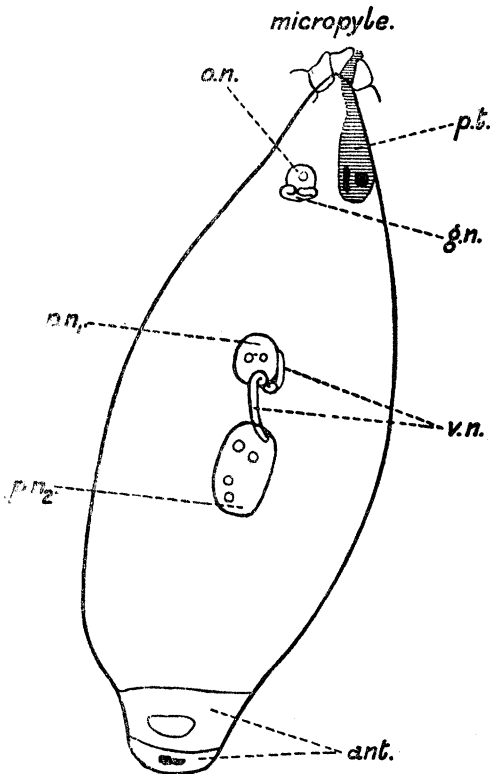
I am fortunate enough to possess a few preparations from the fertilised embryo-sac of *Lilium Martagon*, which, so far as they go, completely confirm the results of Professors Nawaschin and Guignard. The material was fixed in absolute alcohol for researches which were never even begun, but I cut a few hand sections from it immediately

\* Guignard, ‘*Comptes Rendus*,’ April 4, 1899, p. 3 of the separate copy.

† Guignard, *loc. cit.*, p. 6 and figs. 3—5, 7—11.

after fixing, to make sure that it really contained fertilised embryo-sacs. Fourteen sections were kept, all of them stained with methyl green and acid fuchsin. As this, though a brilliant, is rather a diffuse stain, I have lately re-stained eight of the preparations with Renault's hæmatoxylin and eosin, which gives more precise results.

None of these preparations show the vermiform nuclei free in the embryo-sac. In every case conjugation has already taken place; the male nucleus is applied to the female nucleus in the micropylar end of the embryo-sac, and the second generative nucleus is applied to both polar nuclei. In one case only the two polar nuclei are not in contact. The much elongated "antherozoid" unites them like a bridge, one end in contact with the lower, the other end coiled round the upper nucleus (fig. 1, *v.n.*).



Excluding all doubtful cases, eight embryo-sacs show the male and female nuclei not yet fused but in contact. In six of these the male nucleus is more or less elongated. It may be distinctly coiled (fig. 1, *g.n.*), or merely horse-shoe or kidney-shaped, and commonly lies on the upper

or lower side of the much larger female nucleus. (See Guignard's figs. 3, 4, 8, and 10.) In two cases the male nucleus is rounded, or but slightly elongated.

Eight embryo-sacs show the polar nuclei near the centre. In five cases the mass is clearly made up of three nuclei, and the generative nucleus is distinguished from the other two by its irregular shape, the differentiation of a slender chromatic ribbon, and by the absence of a nucleolus. In three embryo-sacs two resting nuclei are applied to each other near the centre.

The pollen tube is very clear in several preparations, and it commonly contains two small nuclei, stained green, and of irregular shape. Since both generative nuclei are accounted for, these are probably due to division of the vegetative nucleus.

*May 18, 1899.*

The LORD LISTER, F.R.C.S., D.C.L., President, in the Chair.

A List of the Presents received was laid on the table, and thanks ordered for them.

The Bakerian Lecture, on "The Crystalline Structure of Metals," was delivered by Professor Ewing, F.R.S., and Mr. W. ROSENHAIN.

The following Papers were read :—

- I. "The Yellow Colouring Matters accompanying Chlorophyll, and their Spectroscopic Relations." By C. A. SCHUNCK. Communicated by Dr. SCHUNCK, F.R.S.
- II. "The Diffusion of Ions into Gases." By J. S. TOWNSEND. Communicated by Professor J. J. THOMSON, F.R.S.
- III. "The Diurnal Range of Rain at the seven Observatories in connection with the Meteorological Office, 1871—1890." By Dr. R. H. SCOTT, F.R.S.

The Society adjourned over the Whitsuntide Recess to Thursday, June 1.